



Penn Energy- Van Dorp
SOLAR ENERGY FACILITY

in the Municipality of Port Hope
Northumberland County
FIT Application No. FIT-FLTV77L
FIT Contract No. F-001573- SPV-130-505

Waterbodies Report
DRAFT

Prepared for: Penn Energy Renewables Ltd.
620 Righters Ferry Road, Bala Cynwyd, PA 19004

Submitted by: Niblett Environmental Associates Inc.
PN 10-066

October 2012



Niblett Environmental Associates Inc.
Biological Consultants

October 18, 2012

PN 10-066

Penn Energy Trust
620 Righters Ferry Road
Bala Cynwyd, PA 19004

Attention : Mr. Glen Tomkinson

**RE: Penn Energy- Van Dorp
SOLAR ENERGY FACILITY
in the Municipality of Port Hope, Northumberland County
FIT Application No. FIT-FLTV77L
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Water Bodies Report-DRAFT

Dear Mr. Tomkinson:

We are pleased to submit the Draft Water Bodies Report for the proposed Van Dorp solar energy facility as part of the Natural Heritage Assessment for this project.

The report follows the outline provided in the MNR Natural Heritage Assessment Manual.

If there are any comments or questions on the content please contact us.

Yours very truly,

Chris Ellingwood
President and Sr. Terrestrial and Wetland Biologist

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1.0 Introduction

1.1 Background

A previously prepared Water Bodies Assessment for the Van Dorp Solar Facility found there are no trout lakes within 300m of the project location, nor are there other lakes or seepage areas 120m from the project location. A permanent stream is located within 120m of the project location boundary, in addition to a drainage feature. The study area is not found within the Oak Ridges Moraine Conservation Plan Area therefore not subject to any of its requirements.

O.Reg 359.09 Section 39 prohibits the construction, installation or expansion of a renewable energy generation facility in a project location that is within the 30 metres of the average annual high water mark of a lake, intermittent stream, permanent stream or seepage area. The intent of this Water Bodies Report is to explore the potential negative environmental effects the renewable energy facility may have on the water bodies and the lands within such minimum 30m distance between the stream and drainage feature. The construction, operation and decommissioning phases and set-backs to water body features will be discussed in the following sections. The report will outline the description of the proposed solar facility including construction methods, operation and decommissioning phases and will address the required set-backs from the water body features. If any negative environmental effects of the project on the water features are identified, the following report will describe how the Environmental Effects Monitoring Plan and Construction Plan Report will address them.

1.2 Solar Facility Project Description

Penn Energy Renewables Ltd. has obtained a Feed-In-Tariff (FIT) contract from the Ontario Power Authority for the construction of a 10 MW (AC) solar PV renewable energy generation facility near the town of Port Hope (Figure 1). The project area is located on part of Lots 23 and 24, Concession 2 in the geographic township of Hope in Northumberland County, known municipally as 2300 Wesleyville Road. The facility consists of single photovoltaic (PV) modules that are approximately 3 ft. x 5 ft. in dimension. Modules are grouped in arrays (8-24 each) which are aligned in rows; these rows are separated by access aisles approximately 12 ft. in width. The project area will consist of 55, 000 PV modules and 10-15 modular collection houses.

The design of the project was modified in order to avoid natural features including water bodies and significant wildlife habitat identified in efforts to minimize any negative effects on these. The project location is entirely located within active agricultural fields. The solar facility will not be located within 30m of any water body with the project location boundary being approximately 60m and the closest solar photovoltaic module or device and transformer station being approximately 70m from such.

2.0 Site Activities, Potential Impacts and Mitigation Measures

2.1 Construction

2.1.1 Overview

The construction activities of the proposed solar energy facility will include gravel laneway, installation of panels, racking, foundations, collection houses and electrical work. The construction and installation will be completed in one phase and will take approximately 6 months. Construction is expected to commence in spring or summer.

To facilitate the installation of racking, modules, and other REGF components, minor grading of the site may be necessary. The majority of the project area is currently comprised of agricultural lands, and as such, major site preparation such as clearing and grading will be greatly reduced in scope. A summary of anticipated construction activities appears in Table 1 including potential negative environmental effects and mitigation measures.

2.1.2 Potential Impacts

No solid, liquid or gaseous wastes will be generated and there is no anticipated change to the water flow on site. No toxic or hazardous materials will be used or generated and therefore no disposal procedures are required. The REA regulation requires the preparation of a Construction Plan Report, which Penn energy anticipates will be submitted as part of its REA application.

Activities associated with the construction of the solar facility which may potentially impact water bodies include:

- Clearing and grubbing of upland areas within project location boundary,
- Stripping and removing topsoil,
- Minor grading, if required,
- Compaction of soil and
- Re-vegetation.

The potential impacts that may occur as a result of the construction of these activities include:

- 1) Decrease in surface water quality and quantity
 - sedimentation of tributary of Port Britain Creek and drainage feature to tributary
 - compaction of soils resulting in increased surface runoff volume
- 2) Impacts to aquatic species and/or their habitat

2.1.3 Mitigation Measures

In order to mitigate from these potential negative environmental effects several recommendations are listed below.

2.1.3.1 *Decrease in Surface Water Quality and Quantity*

Permanent Stream

There is potential for a decrease in surface water quality to occur as a result of the construction activities. The project location boundary is a minimum of 60m from the tributary. No construction activities will be conducted within 30 meters of the watercourse. The area between the woodlot buffering the watercourse will be mowed once every two years in late fall in order to remove any volunteer trees and shrubs trying to establish and to maintain Generalized Significant Wildlife Habitat per the Environmental Impact Study (NEA, 2012). The wooded area (WO02) located between the watercourse and the project location will act as a good buffer, preventing sediment entering the watercourse (Refer to ELC information within the Site Investigation Report (NEA, 2012)). It is recommended the water body feature be clearly identified in construction plans and that no activities enter the woodlot (WO02) (Refer to Figure 3 in the Site investigation Report (NEA, 2012) for location) just south of the water body. The Construction Plan Report prepared in accordance with O.Reg 359/09 details specific construction measures to be taken to avoid impacts to the water body.

Drainage Feature

The drainage feature located on the north central portion of the property receives water from the agricultural fields south of it (project location). This feature should be clearly marked on the construction plans and no activities should occur within 30 m (of the feature). The project location boundary has been positioned 30 meters from this feature in order to mitigate for potential impacts due to construction activities. In addition, it is recommended that silt fencing be placed around the borders of the project location boundary on this northern edge in order to prevent sedimentation of the drainage feature connecting to a tributary of Port Britain Creek. As the site is generally flat and little grading will occur it is likely that drainage will continue to originate from the south and into this feature. The Construction Plan Report prepared in accordance with O.Reg 359/09 details specific construction measures to be taken to avoid impacts to the water body.

Compaction of Soils

The compaction of soils within the project location boundary could potentially occur as a result

of the construction taking place. The large trucks required for grading and grubbing of the site, in addition to the construction of laneways can cause compaction of soils which may decrease water infiltration. As a result of this an increase in surface water run-off could be directed to the drainage feature and/or watercourse potentially causing an increase in temperatures within the stream affecting the aquatic habitat and increasing the volume of water contributing to the Port Britain Creek. The entire project location is within agricultural fields, thus construction within this area and the removal of crops will not greatly change the landform. Adherence to the MOE's Stormwater Management Planning and Design Manual (2003, Pub. 4329e) and measures such as re-vegetation within the project area will prevent erosion and promote infiltration. There is no predicted redirection of runoff as the solar farm will generally follow the existing topography. Implementing these measures together with activities taking place a minimum of 30m from the water features will result in no negative effect on the water body features..

No regulated water takings are proposed for this project or are known to exist within the study area.

2.1.3.2 Impacts to Aquatic Species and Their Habitats

Aquatic species inhabiting water bodies within proximity to the project location have the potential to be impacted from the construction activities. No project activities will be conducted within 30 m of any water body. This will protect the aquatic species and their habitats. No turtles or amphibians were observed using the tributary therefore no impact to turtles and amphibians are expected as a result of the construction activities. No species of conservation concern were observed within the watercourse or adjacent to it.

2.2 Operations

2.2.1 Overview

Once construction and installation is complete, regular light maintenance is required which will consist of site visits to inspect electrical and non-electrical components and conduct minor site maintenance. Since maintenance is on an as-needed basis, no permanent on-site personnel are required for daily operations. Such maintenance would also include regular mowing, as frequently as weekly, within the facility and the landscaped areas outside the perimeter fence along the southern boundary. An area that is a maximum of 5 m wide on the outside of the perimeter fence on the western, northern and eastern boundaries will also be mowed regularly to ensure that no woody vegetation becomes established where it could cause damage to the fence or shade the solar modules. Additional visits will occur as necessary to maintain the solar components. Table 1 summarizes the operation activities, potential environmental effects and mitigation measures. It is anticipated that the solar facility will generate electricity year round during the daylight hours.

2.2.2 Potential Impacts

The potential for the constructed solar facility to increase surface runoff is limited due to the minimal amounts of impervious surfaces incorporated into its design. Specifically:

- The PV modules are mounted above grade – allowing for grass to be propagated below and between the array tables;
- The foundation system is relatively minimal and consists of generously spaced posts or piers (only one per every 6-15 modules, depending on final engineering) which amounts to a very small footprint on the soil itself. These posts are the only point of contact between the arrays and the ground. The posts occupy substantially less than one percent (1%) of the site area (approximately 0.0015). Accordingly, any change to stormwater runoff will be diminimus;
- There will be no paving. The access lanes are farm lanes; if required, they will be stabilized with gravel, which is typically considered a pervious surface; and
- The collection houses and transformer stations will also occupy substantially less than one percent (1%) of the site area;

Together these factors will avoid concentration of runoff and significantly decrease (if not eliminate altogether) the amount of precipitation that will not be absorbed by the soils in the immediate vicinity. It is anticipated that there will be little, if any, change to the quantities or rates of stormwater runoff. Compared to the pre-development condition, any impact is too negligible to warrant stormwater management controls beyond sediment control during construction.

All activities conducted as part of the operational phase will be conducted a minimum of 30m from the watercourse and drainage feature. No impacts to the water bodies are anticipated as part of this phase.

2.3 **Decommissioning**

The installed components have almost no long-term or permanent impact on the site. Panels, racking, cabling, collection houses, and other equipment can be removed after they have fulfilled their life expectancy of 20-30 years. Following decommissioning the facility site will be restored, to the extent possible, to pre facility conditions in accordance with local land use laws or regulations and pursuant to the landowner's desires. It is not anticipated that construction, operation or decommissioning of the facility will have any negative or permanent effects on natural features or water bodies within the area. Decommissioning activities will be conducted outside of the 30 m setback to the watercourse and the drainage feature. Table 1 summarizes the decommissioning activities, potential environmental effects and mitigation measures. The Decommissioning Plan Report prepared in accordance with O.Reg 359/09 also details specific

construction measures to be taken to avoid impacts to the water body.

Table 1: Potential Environmental Effects and Mitigation Measures

Activity	Potential Environmental Effect	Mitigation Measures
Site Preparation – Construction <ul style="list-style-type: none"> • Clearing and grubbing of upland areas within project location boundary. • Stripping and removing topsoil • Minor Grading, if required • Compaction of soil and re-vegetation 	Increased erosion, sedimentation, turbidity and temperature Changes in natural drainage patterns	<ul style="list-style-type: none"> • Avoidance – implement a 30m buffer surrounding the water body features • Design – minimize topographic change, work with existing contours • Install silt fencing between water features and project location boundary to control sediment • Develop a Soil Erosion and Sediment Control Plan during construction design employing best management practices • Minimize vegetation removal where possible • Control access and movement of construction equipment and personnel • Re-seed/re-vegetate as soon as possible after disturbance • Protect WO02
Equipment Installation – Construction <ul style="list-style-type: none"> • Installation of Panels, collection houses and fence • Panel foundations are driven, screwed or cored and grouted into the ground (depending on soil conditions) 	Increase in impervious surfaces Increased erosion, sedimentation, turbidity and temperature increase	<ul style="list-style-type: none"> • Design – ensure minimum impervious surfaces by utilizing gravel for access roads with no curbs to promote infiltration • Maintain Site Preparation sediment controls • Control access and movement of construction equipment and personnel • Re-seed/re-vegetate as soon as possible after disturbance
Operation/Maintenance <ul style="list-style-type: none"> • Washing/clearing of solar panels. • Inspection of electrical and non-electrical components. • Replacing panels, wiring or other components as required. General landscape	None	

maintenance.		
Decommissioning <ul style="list-style-type: none"> Removal of materials and disposal off-site at an appropriate location. Site is re-vegetated or left to regenerate back to existing conditions or a condition deemed appropriate at the time 	Waste materials entering provincial landfills Increased erosion, sedimentation, turbidity and temperature increase	<ul style="list-style-type: none"> . Recycling or refurbishing materials where possible. Control access and movement of construction equipment and personnel Re-seed/re-vegetate as soon as possible after disturbance Install sediment controls where necessary

3.0 Conclusions

In the initial stages of the project the placement of solar arrays and the boundary of the project location were positioned around the natural features and water bodies in order to minimize any potential negative impacts that could occur as a result of the project. A 30 m setback has been established between the project boundary and both water bodies (tributary of Port Britain Creek and drainage feature). The setback to these features is to be left in its natural state to regenerate, establishing a vegetative buffer between project activities and the water body.

In addition to mitigation measures outlined in Table 1, several others should be implemented to protect the watercourse and drainage feature including placing a silt fence on the northern limits of the project location boundary where the drainage feature exists, implementing a 30m setback from the water bodies and not permitting any project activities within Woodlot 2 (ID WO02, see Site Investigation Report and Figure 3 for details). Potential impacts to the water bodies have been minimized through avoiding these features and establishing the project location boundary 30 m away.

No monitoring is required as a result of the findings of this report.

4.0 References

- Lee, H., Bakowsky, W., Riley, J., Bowles, J., Puddister, M., Uhlig, P. and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. OMNR, South Central Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.
- MMAH. 2005. Ontario Provincial Policy Statement. Ministry of Municipal Affairs and Housing
- Niblett Environmental Associates. 2012. Water Bodies Assessment Records Review.
- Niblett Environmental Associates. 2012. Water Bodies Assessment Site Investigation Report.

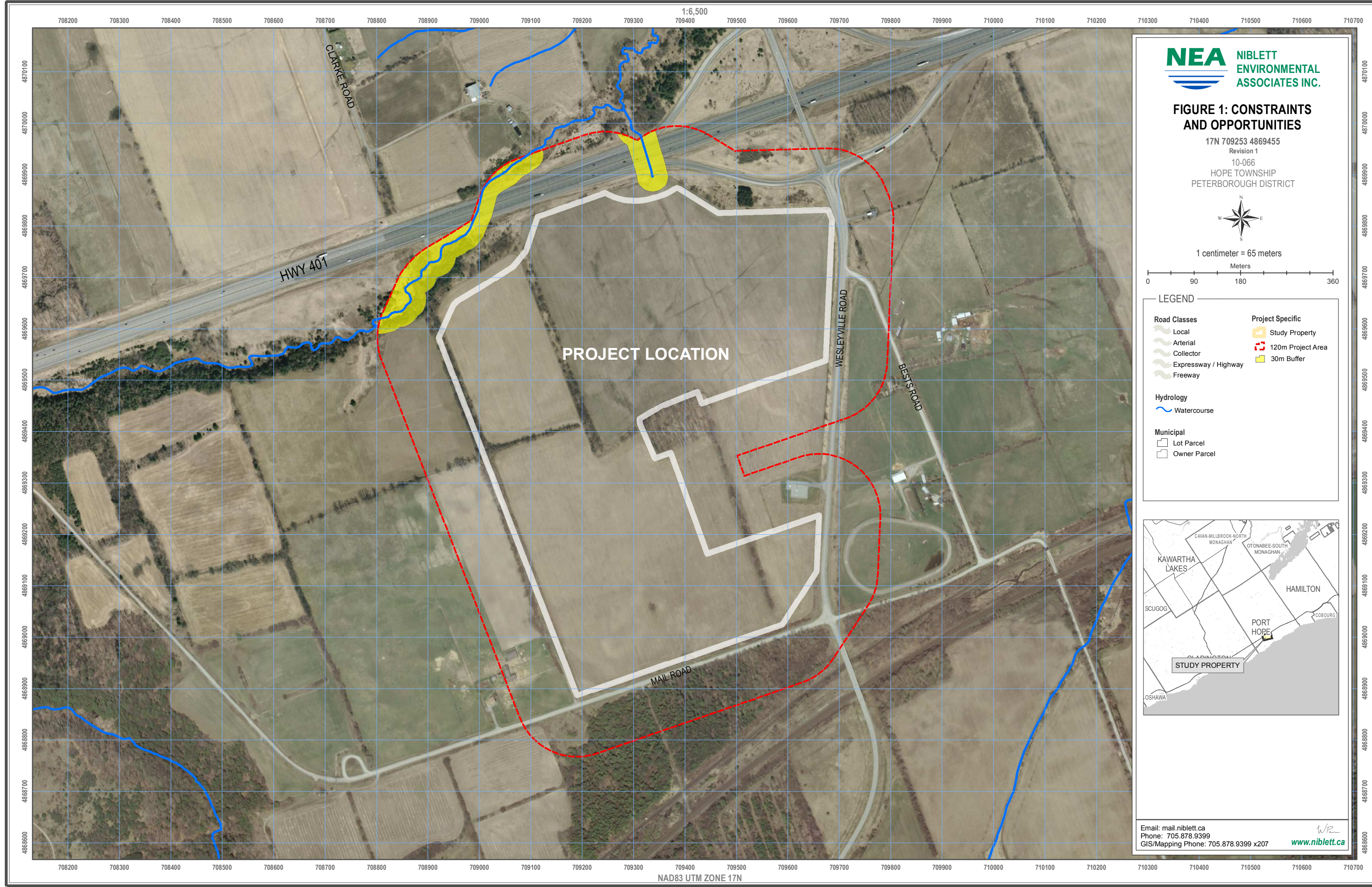
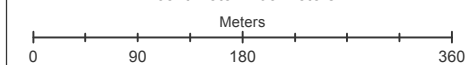


FIGURE 1: CONSTRAINTS AND OPPORTUNITIES

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Revision 1
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HOPE TOWNSHIP
PETERBOROUGH DISTRICT



1 centimeter = 65 meters



LEGEND

- | | |
|----------------------|-------------------------|
| Road Classes | Project Specific |
| Local | Study Property |
| Arterial | 120m Project Area |
| Collector | 30m Buffer |
| Expressway / Highway | |
| Freeway | |
| Hydrology | |
| Watercourse | |
| Municipal | |
| Lot Parcel | |
| Owner Parcel | |

